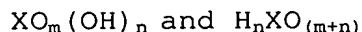


CLAIMS

1. A method for roughening a copper surface, comprising the step of subjecting the copper surface to etching using a liquid etchant so that the copper surface is provided with acicular projections; said liquid etchant including a main component containing at least one acid selected from the group consisting of oxo acids represented by one of the following chemical formulae:



wherein X is a central atom, m is an integer of 0 or more, and n is an integer of 1 or more and derivatives thereof and at least one compound selected from the group consisting of peroxides and derivatives thereof; and an auxiliary component containing at least one tetrazole.

2. A method for roughening a copper surface as defined in claim 1, wherein said auxiliary component contains at least one halide selected from the group consisting of chlorides, fluorides and bromides.

3. A method for roughening a copper surface as defined in claim 2, wherein said at least one halide is a chloride which is contained in the liquid etchant so that a chlorine ion concentration is 50 mg/l or less.

4. A method for roughening a copper surface as defined in claim 2, wherein said at least one halide is a fluoride which is contained in the liquid etchant so that a fluorine ion concentration is 50 g/l or less.

5. A method for roughening a copper surface as defined in claim 2, wherein said at least one halide is a bromide which is contained in the liquid etchant so that a bromine ion concentration is 0.1 g/l or less.

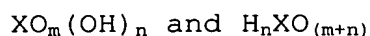
6. A method for roughening a copper surface as defined in claim 1, wherein said auxiliary component further contains a second azole.

7. A method for roughening a copper surface as defined in claim 1, wherein said m in said chemical formulae representing said oxo acids is 2 or more.

8. A method for roughening a copper surface as defined in claim 1, wherein said (m+n) in said chemical formulae representing said oxo acids is 4 or more.

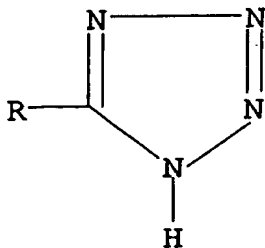
9. A method for roughening a copper surface, comprising the step of subjecting the copper surface to etching using a liquid etchant so that the copper surface is provided with acicular projections;

said liquid etchant including a main component containing at least one acid selected from the group consisting of oxo acids represented by one of the following chemical formulae:

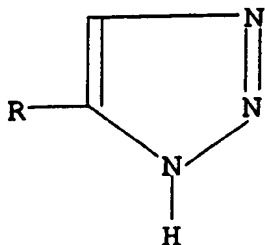


wherein X is a central atom, m is an integer of 0 or more, and n is an integer of 1 or more and derivatives thereof and at least one compound selected from the group consisting of peroxides and derivatives thereof; and an auxiliary component containing at least one azole selected from the group consisting of 1,2,3- azoles which have three or more nitrogen atoms arranged in succession in a five-membered N-heterocycle thereof.

10. A method for roughening a copper surface as defined in claim 9, wherein the 1,2,3-azoles are represented by one of the following chemical formulae:



and



wherein R is selected from the group consisting of hydrogen, methyl, amino, carboxyl and mercapto radicals.

11. A method for roughening a copper surface as defined in claim 9, wherein said auxiliary component contains at least one halide selected from the group consisting of chlorides, fluorides and bromides.

12. A method for roughening a copper surface as defined in claim 11, wherein said at least one halide is a chloride which is contained in the liquid etchant so that a chlorine ion concentration is 50 mg/l or less.

13. A method for roughening a copper surface as defined in claim 11, wherein said at least one halide is a fluoride which is contained in the liquid etchant so that a fluorine ion concentration is 50 g/l or less.

14. A method for roughening a copper surface as defined in claim 11, wherein said at least one halide is a bromide which is contained in the liquid etchant so that a bromine ion concentration is 0.1 g/l or less.

15. A method for roughening a copper surface as defined in claim 9, wherein said auxiliary component further contains a second azole.

16. A method for roughening a copper surface as defined in claim 9, wherein said m in said chemical formulae representing said oxo acids is 2 or more.

17. A method for roughening a copper surface as defined in claim 9, wherein said (m+n) in said chemical formulae representing said oxo acids is 4 or more.